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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,327	06/30/2003	Robert Bruce Darling	UWOTL121266	3726
26389	7590	10/04/2005	EXAMINER	
CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC 1420 FIFTH AVENUE SUITE 2800 SEATTLE, WA 98101-2347			SOUW, BERNARD E	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 10/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,327

Applicant(s)

DARLING ET AL.

Examiner

Bernard E. Souw

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 July 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 and 40-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23, 26-31 and 40-45 is/are rejected.
- 7) ☒ Claim(s) 24 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/30/03, 1/30/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Preliminary Amendment

1. The Response filed 07/27/2005 has been entered.

No claims has been cancelled or amended.

Pending in this Office Action are claims 1-31 and 40-45.

Election/Restrictions

2. Applicant's reaffirmed the election of claims 1-31 and 40-45 in the reply filed on 07/27/2005. The restriction/election process is herewith considered FINAL.

Claim Objection Withdrawn

3. Claim 45 having been amended but previously overseen, the previous objection under 37 CFR 1.75(c) is now withdrawn.

Double Patenting Rejection Withdrawn

4. The present application having been filed prior to the issuance of the reference patent USPAT 6,847,036, the previous Obviousness Type Double Patenting rejections of claims 11, 13, 14, 15, 16, 30, 40 and 43-45 are now withdrawn.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 4, 5, 6, 8, 11, 26, 40, 43 and 44, are rejected under 35 U.S.C. 102(a) and (e) as being clearly anticipated by Tracy et al. (USPAT 6,180,942).

Tracy et al. disclose in Figs.2-4 a charged particle detection system, comprising:

(a) an electronic multiplexing unit connected to 40 in proximity to (b) a plurality of charge-collecting zones 34, wherein each charge-collecting zone 20 shown in Fig.2 comprises a conductive material for receiving (34) and storing (38) charge shown in Figs.3-4, wherein each charge-collecting zone 34 is isolated and electrostatically shielded from neighboring charge-collecting zones 34 by a separator comprising an electrical conductor (charge storage) 38 held at a reference potential, the conductor 38 insulated by silicon oxide insulator 35, as shown in Fig.3A or Fig.4, wherein each charge-collecting zone 34 is electronically interfaced (over the charge storing unit 38) to the multiplexing unit connected to 40, as shown in Fig.3A and wherein the multiplexing unit is interfaced to a means for measuring the charge collected by the charge-collecting zones, as recited in Col.4/II.6-65.

► Regarding claim 4, Tracy's detector array comprises silicon oxide insulating layers 35 and conducting layers 34 shown in Fig.4, as recited in Col.4/II.23-58.

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- ▶ Regarding claim 5, Tracy's insulating layer comprises a high dielectric strength, low leakage material, as recited in Col.2/ll.28-31 in view of Col.2/ll.14-17.
- ▶ Regarding claim 6, Tracy's conducting layer 34 in Fig.4 is made of aluminum (see label).
- ▶ Regarding claim 8, Tracy's separator 32 (silicon) supports the charge collecting zones 38, as shown in Fig.4.
- ▶ Regarding claim 26, Tracy's separator, charge-collecting zones 34, multiplexing unit and means for measuring the charge (connected to 40), are mounted on a single substrate 32 (silicon), as can be seen in Fig.4.
- ▶ Regarding claim 40, a charged particle (CP) source is shown in Fig.7 by numeral 66, as recited in Col.5/ll.51-52.
- ▶ Regarding claims 11, 43 and 44, Tracy's charge-collecting zone(s) comprises a Faraday cup (array), as recited in Col.1/ll.30-31.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 17, 18 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al.

Tracy et al. show all the limitations of claims 17 and 18, as previously applied to the parent claim 1, also including the limitation of absolute ion currents of very small magnitudes, as recited in Col.2/ll.49-51.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Tracy's detector array to measure absolute ion currents from about 0.2 pA to about 1.4 μ A, as recited in the claims, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

One of ordinary skill in the art would have been motivated to specify the range of current being measured with Tracy's apparatus to between about 0.2 pA to about 1.4 μ A in order to commensurate with the actual need.

► Regarding claims 29-31, the limitations are inherent in the size limitations recited in Col.3/ll.18-21 in view of Col.1/ll.30-31.

9. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Stine (USPAT 4,720,706).

Tracy et al. show all the limitations of claims 2 and 3, as previously applied to the parent claim 1, except the recitations of using a "gray-code" and "greater than 98% read-out duty cycle".

Stine describes a digital read-out method for an array that is also applicable to Tracy's array, as generally understood in the art. Using a "gray-code" to express any

intensity is conventional in most digital method, as taught by Stine in Col.5/II.15-26, more specifically by the term "intensity shading" in Col.5/II.25-26. Stine's read-out method also has a high duty cycle in the order of greater than 98%, as specifically recited in Col.15/II.7-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a gray code to read the ion current intensity of Tracy's array, in order to obtain information not only about the presence of a current, but most importantly, also its magnitude.

One of ordinary skill in the art would have been motivated to use Stine's method of high duty cycle on Tracy's detector array, since high duty cycles are also efficient.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Frank et al. (USPAT 5,994,694).

Tracy et al. show all the limitations of claim 7, as previously applied to the parent claim 1, except the recitation of aluminum oxide as insulating layer.

Frank et al. disclose a detector array similar to Tracy's, in which aluminum oxide is specifically used as insulating layer, as recited in Col.7/II.30-34

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use aluminum oxide as insulating layer, since aluminum oxide is known in the art as having a high electrical resistance.

One of ordinary skill in the art would have been motivated to modify Tracy's device by adopting Frank's aluminum oxide as insulating layer, since a high electrical

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resistance is desirable to better isolate the detector from each other, thus preventing a cross talk in reading.

11. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Freidhoff et al. (USPAT 5,386,115)

Tracy et al. show all the limitations of claims 9 and 10, as previously applied to the parent claim 1, except the recitation of copper, chromium or gold as conductive material made by vapor deposition method.

Freidhoff et al. disclose an ion detector array similar to Tracy's. Freidhoff's conductive material is made of gold, as recited in Col.5/ll.12-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use gold as conductive material because of its high electrical conductivity, non-corrosive and non-magnetic properties.

One of ordinary skill in the art would have been motivated to use materials of high conductivities in order to minimize the losses, especially at very low current levels.

12. Claims 11-16, 19-23, 27, 28, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Benveniste et al. (USPAT 5,198,676).

Tracy et al. show all the limitations of claims 11-16, 19, 20-22, 23, 27, 28, 30, 41 and 42, as previously applied to the parent claims 1 and 40, except for specific limitations to be individually addressed as follows:

► Regarding claims 11-16, the recitation of using Faraday cups as charge collecting zone(s) is already recited by Tracy et al. in Col.1/II.30-31. More specifically, Benveniste et al. make use of Faraday cup(s) as shown in Fig.3 and Fig.8, as recited by Benveniste in Col.1/II.57-59, Col.2/II.52-55 and Col.4/II.22-25.

- Specifically regarding claim 12, an aspect ratio of about 2:1 can be seen in Benveniste's Fig.3.
- Specifically regarding claim 14, a linear array (of Faraday cups) is recited by Benveniste et al. in Col.9/II.12-17.
- Specifically regarding claims 13 and 15, a two-dimensional array is shown by Benveniste et al. in Fig.8.
- Specifically regarding claim 16, a stack of Faraday cups can be seen in Tracy's Fig.6 (numerals 30A to D) in combination with Col.1/II.30-31.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Faraday cups as charge collecting zone(s) since it is already suggested in the primary reference (Tracy et al.) in Col.1/II.30-31.

One of ordinary skill in the art would have been motivated to modify Tracy's Faraday cup(s) specifically with Benveniste's various Faraday cups arrangements, in order to better meet the geometrical condition(s) of the spatial distribution of the ion beam to be measured.

► Regarding claims 19 and 20, the recitation of 2^n zones with large values of n is already recited by Tracy et al. in Col.4/II.53-57, whereas 64 and 256 zones are specifically recited by Benveniste et al. in Col.5/II.23-25 and Col.7/II.10-11.

- ▶ Regarding claim 21, operational amplifier(s) is shown in numeral 260, Fig.10, by Benveniste et al., as recited in Col.6/ll.6-8.
- ▶ Regarding claims 22 and 41, the recitation of a mask is recited by Benveniste et al. in Col.2/ll.53-55 in reference to Fig.8.
- ▶ Regarding claims 23 and 42 the recitation of a suppressor grid is recited by Tracy et al. in Col.2/ll.63-67 and further, in Tracy's claims 6 and 11.
- ▶ Regarding claims 27 and 28, the recitation of a PC board having traces electrically connected to the charge collection zones is recited by Benveniste et al. in Col.6/ll.30-33.

Final Rejection

13. No new ground(s) of rejection is presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP §706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Response to Applicant's Arguments

14. Applicant's arguments filed 07/27/2005 has been fully considered, but they are not persuasive:

Applicant's argument based on Exhibit A is moot, because Applicant has misinterpreted the Examiner's rejection of claim 1 by misidentifying the silicon substrate 32 as being the insulator, instead of the correct interpretation that Tracy's separator comprises an electrical conductor (charge storage) 38 held at a reference potential, the conductor 38 insulated by silicon oxide insulator 35, as shown in Fig.3A or Fig.4, wherein each charge-collecting zone 34 is electronically interfaced (over the charge storing unit 38) to the multiplexing unit connected to 40, as shown in Fig.3A. In this Office Action the narrative of the rejection is slightly revised in order to correct/avoid Applicant's misinterpretation.

Note, Figs.3, 3A and 4 belong to one and the same embodiment, as implicated in Col.4/ll.23-57, so the rejection under 35 U.S.C. 102 (a) and (e) is proper. Thus, Applicant's argument that the "*Tracy reference fails to teach, suggest, provide any motivation to make, or otherwise render obvious the claimed invention*" is invalid, because a motivation is not at all required for a rejection under 35 U.S.C. 102.

Applicant's further arguments are based on the same misinterpretation of the Examiner's rejection of claim 1, and hence, they also are all unpersuasive.

Indication of Allowable Subject Matter

15. Claims 24 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Indication of Allowable Subject Matter

16. The following is a statement of reasons for the indication of allowable subject matter:

A detector array for measuring ion currents of low magnitudes, further comprising means for increasing the temperature of the detectors and controlling the temperature of the system, has neither been anticipated nor rendered obvious by any prior art.

Relevant Prior Art

17. This prior art made of record and not relied upon is considered pertinent to applicant's disclosure: USPAT # 6,815,668, issued to Miller et al. on 11/09/2004 (filed 03/05/2001) and USPAT 6,806,463, issued to Miller et al. on 10/19/2004 (filed 12/16/2002), are found to claim the same subject matter as the present invention, also including the limitation of increasing and controlling the temperature of the detector system. However, the filing dates of the two cited references are predated by the earliest priority date of the present invention, i.e., 01/22/1999 (provisional application), and are therefore inapplicable as prior art.

Communications


18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 571 272 2482. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 571 272 2477. The central fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications as well as for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

bes

September 30, 2005


JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800